DEFENCE R&D **DÉFENSE**

The ComplexityHub web site

Needs, requirements, and development

M. Couture
M. DuCharme
DRDC Valcartier

Canada

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M. Couture
M. DuCharme

Defence R&D Canada – Valcartier

Principal Author

M. Couture
Defence Scientist

Approved by

Guy Turcotte
SdS Section Head

Approved for release by

Abstract

This document presents a high-level description of the ComplexityHub web site. It lists the main needs, requirements and layouts for most web pages of the site.

This text originates from conception and development works that was initiated by DRDC Valcartier during summer 2007. The goal was to build a national and international collaboration tool that is dedicated to studies on complexity.

Résumé

Ce document présente une description haut-niveau du site web ComplexityHub. Il liste les besoins principaux, requis et arrangements pour la plupart des pages web du site.

Ce texte provient essentiellement des efforts de conception et de développement qui ont été initiés par la RDDC Valcartier à l'été 2007. Le but était de construire un outil de collaboration national et international dédié aux études sur la complexité.

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Acknowledgements

1 Introduction

- The world is perceived as becoming more and more complex.

- Consequently, DND is facing new challenges related to complexity and DRDC is increasing its research activities related to the complexity theory.

- This document proposes and gives a high-level description of a tool, the ComplexityHub web site that will be used to share information on complexity among the DND S&T enterprise, national and international military research communities; the academia and the industry.

- The information presented in this document comes from the specifications of the ComplexityHub web site. It is presented under the form of bullets.

1.1 High-level needs and goals

- DND people from many military domains will have to increasingly rely on concepts of Complexity theory (CxT). Some domains are:

  - Design of military strategies, doctrines, scenarios.

  - Design, development and validation of complex systems (CxS).

  - Complex military operations (full spectrum) including adaptive campaigning.

  - The study of neutral and enemy's CxS.

  - Engineering of complex systems and capabilities.

- R&D at DRDC must facilitate the use of concepts of CxT. It may for instance contribute to:

  - Find where, how and when these concepts can be used.

  - Help the understanding of complex concepts by military people.

  - Improve and develop means to ease this understanding.

  - Find new ways of studying, understanding, using and better control CxS.

  - Many other related fields of R&D.

- There is a need within the DRDC to improve communication related to CxT.

  - Many DRDC scientists are currently studying CxT but they do not necessarily know each other's work.

- A means is needed to share information related to:

  - People that are working in the field of CxT.

  - Existing projects that are related to CxT.

  - Existing documentation: report, papers, presentations on CxT.

  - Existing activities: congresses, workshops, trainings, discussions, etc.

- Used tools: the ones that are already used, the ones under development.
- Ways CxT can help military client.

1.2 Adopted solution and high-level requirements

- The proposed solution: A web site that will be a repository for all kinds of information/events/etc. related to CxT and CxS.
  - It will aim, among others, at favouring the sharing of information regarding complexity problems the DND S&T Enterprise is currently and will be facing.
- The proposed name for this web site is: "ComplexityHub Web Site" (CHWS).
- The CHWS should attract scientists primarily from DRDC but also from all around the world sharing common research interest related to CxT and CxS.
- People that may become member of the CHWS will be from:
  - The DND S&T Enterprise:
    - Scientists at DRDC.
    - Canadian Forces military partners.
    - Scientists from other federal departments.
  - Allied countries and contractors:
    - TTCP.
    - NATO.
    - Contractors from the industry.
    - Contractors from the academia.
  - People at large:
    - Canadian population.
    - Industry.
    - Academia.
    - Others (media, etc.).
- These people will be able to become member of the CHWS at different levels.
- The CHWS should be reachable from any Internet node all around the world.
- The CHWS should contain or provide all functionalities that will foster collaboration among members.
- The CHWS should be user friendly.
- The CHWS should include different levels of security allowing defence scientists from DRDC, TTCP and NATO countries, and contractors to share sensitive (although not classified) information safely.

1.3   DRDC Valcartier resources

- Michel B. DuCharme (418-844-4000-4224; michel.ducharme@drdc-rddc.gc.ca)

- Mario Couture (418-844-4000-4285; mario.couture@drdc-rddc.gc.ca)

1.4   Scope and focus of this work

- The contract (# 72732) for the building of the ComplexityHub web site has been attributed in August 2007 to the following enterprise:

    ◆ Leonard Design et Génie Web (Karl Demers; 418-780-1706 poste 226; http://www.leonarddg.com/; 5275, boul. Wilfrid-Hamel, bur. 220 Québec (Québec) G2E 5M7)

- This document contains a high-level description of the needs, requirements and the work that was done.

- At the beginning of the contract:

    ◆ It was not expected that Leonard would do all the work that would answer all listed needs and requirements that are described in this document.

    ◆ Instead, given the amount of money DRDC Valcartier made available for this contract, Leonard had to build the most complete working structure of the first version of the ComplexityHub web site. This work had not to make a complete and definitive web site.

    ◆ For instance, the content (such as text, logo, etc.) was not part of this contract.

    ◆ Leonard was allowed to deviate from this description if they judge that other solutions or approaches were better.

    ◆ This description (this document) was written by people that have limited expertise in this domain. Thus, people from Leonard should also play the role of advisers.

    ◆ The first version of the web site had to be available by the first or second week of September 2007.

1.5   Objectives of the first phase of the web development

- Develop a framework for the web site.

- Develop basic functionalities and provide essential services to launch a functional web site on complexity.

- Investigate the interest from different complexity research communities for a web site on complexity.

- Get feedback from users to help in the further development of the web site.

2 The ComplexityHub web site (CHWS)

This Chapter provides a high-level description of the CHWS (www.complexityhub.org).

2.1 The Structure of the CHWS

Figure 1 shows the proposed structure of the CHWS.
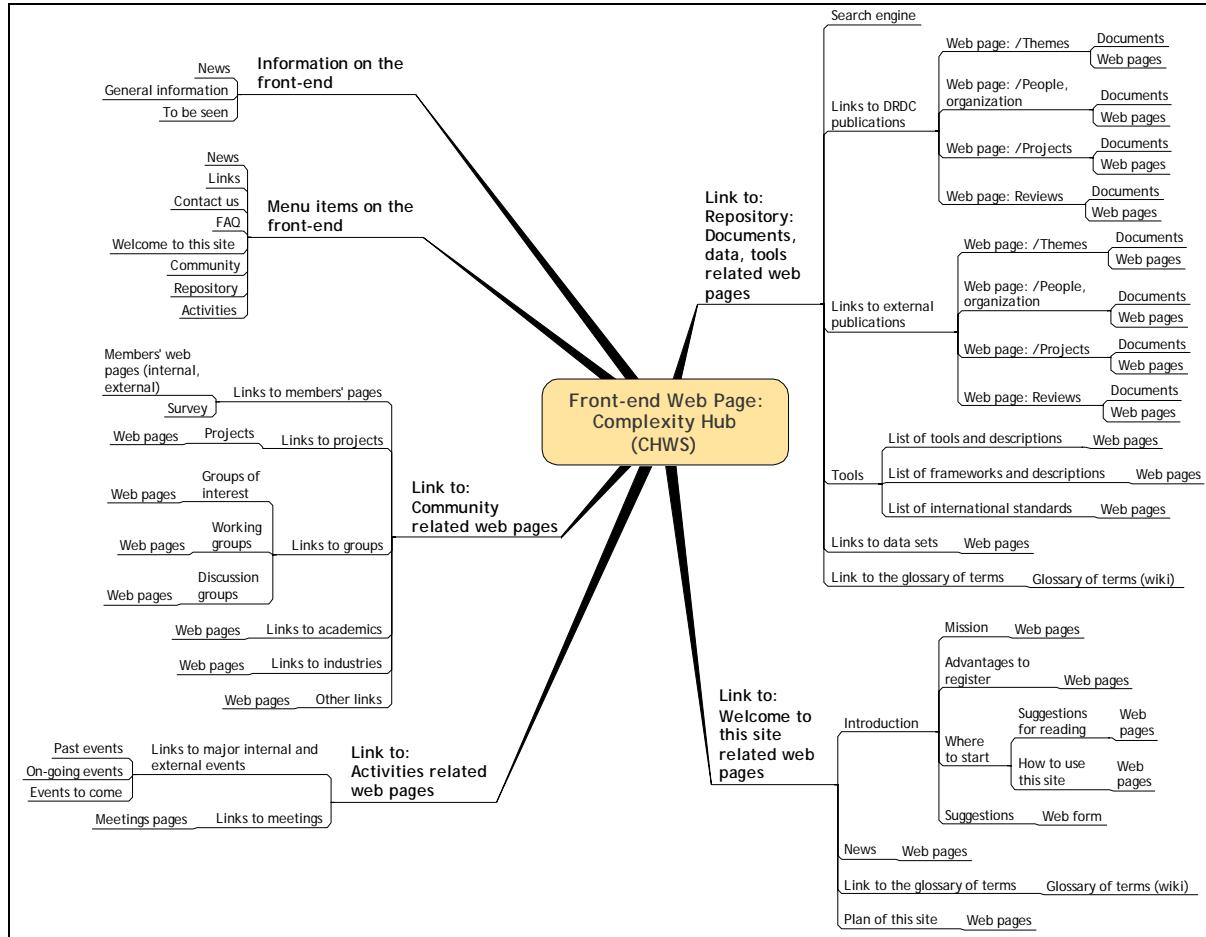
Figure 1. The Content and structure of the CHWS.

- Front-end web page contains links to:
- The introduction page of the CHWS contains general information and links to:
  - The Welcome pages.
  - The Complexity Community pages.
  - The Repository pages.

- ◆ The Activity pages.
- The Welcome page contains links to:
  - ◆ Introduction pages that describe the mission, the how-to-register, the where-to-start and general suggestions.
  - ◆ News pages.
  - ◆ Glossary of CxT related terms pages.
  - ◆ Plan of the CHWS site.
  - ◆ Search engine for the whole CHWS web site.
- The Community page contains links to:
  - ◆ Members' pages.
  - ◆ Projects' pages.
  - ◆ Internal Groups' pages.
  - ◆ External Groups' pages.
    - ▪ TTCP.
    - ▪ NATO.
    - ▪ Academics' pages.
    - ▪ Industries' pages.
  - ◆ Other relevant pages.
- The Repository page contains a search engine and links to:
  - ◆ DRDC publications pages.
  - ◆ External Publications pages.
  - ◆ Tools pages.
  - ◆ Data Sets pages.
- The Activity page contains links to:
  - ◆ Major Events' pages.
  - ◆ Meetings' pages.

2.2   Utilization of the CHWS – Access rights

- Any person with a genuine interest in complexity research will be able to register to the CHWS (upon invitation or proposition).
- It is proposed to implement three security levels:
  - ◆ Public for visitors (front-end, welcome and contact web pages). This is security level 0 where anyone could access open-source information, but could not add new information to the web site.

- private-ComplexityHub members (within the site but outside groups' web pages). This is security level 1 where the members could access open-source information, add new information to the web site and propose the creation of new groups.
- private-ComplexityHub-group members (within the site and inside groups' web pages for which the user is registered). This is security level 2 where the members could have the privileges of security level 1 in addition to be able to access and add new sensitive information from an existing group.

2.3   Host of the CHWS

- Hostpapa
  - Address: www.complexityhub.org

3   Needed services

The following sections provide a short description of some web services that will be needed in the ComplexityHub.

3.1   Visitor, member, group and security management

- Visitor management.

- Member management.

- Group management.

- ComplexityHub web pages.

- User web pages.

- Group web pages (sub-domains).

3.2   Security management

- Visitors, members, group members, administrators).
    - Password protected access.
    - SSL, …

- Administrators have access to one log in the backend or individual logs on each page where they can view changes that have been made to the database. Those can be rolled back to previous changes with by clicking the history brush.

- Simple workflow lifecycle can be set up so that the work of an editor must be approved by a reviewer.

- An administrator can grant as little or as much control to content editors or groups as needed. They can remove buttons and extensions that are not needed for different editors.

- Backend and front-end user authentication.

- A log of failed and successful logins is kept in the backend along with IP addresses of the users.

- Only allow users to log in from one IP address.

- Only allow users to log in from one domain.

- Alerts for successful and failed logins can be sent to administrators.

- Administrators can set up a section within the system to test new features without disturbing the main site.

- For editors, simultaneous editing and potential loss of work is prevented since a warning sign is displayed to users trying to access an already opened record. To administrators, the time since the record has been accessed and the user name is visible.

- Administrators can disable user accounts or change their passwords at any time.

- Run site through SSL.

- Login through SSL and return to non-SSL backend.

- Set specific pages to be SSL in front-end.

- Unlimited versioning. You can save a state of the content so that it can be reverted at a later date. You can save versions of a page or a set of pages and edit those versions. You can swap the versions out with a touch of a button.

- Unlimited history. You can "undo" any change you make on the site.

3.3 Content management

- File management

- Database reports

- Content management

- Syndicated content: Content that is generated or provided on a website from another source and is updated automatically without your intervention.

3.4 Novelty management

- News

- Newsletter subscription

- Notification functionality.

  ◆ RSS.

- Dynamic management of web pages content functionality.

3.5 Event management

- Calendar

- Others

3.6 Email management

- Contact management.

- Mailing list.

- Sending email functionality (individual, groups).

3.7 Management of the ComplexityHub web site

- Structure management.

- Content management.

3.8   Search engines

- A search engine that uses the ComplexityHub security policies.

- Editors can perform a search for a key phrase within a section of the site. The results will return all the content elements with the phrase included. These can be edited at the same time. An extension performs a similar function, but allows the string to be replaced.

3.9   Peer production, collaboration

- Blog
- Wiki (different versions of Wiki)
- Discussion board, forum

3.10   Edition and other operations

- A code-free editor.
- Intuitive user interface (UI).
- Configurable UI (skins).
- Spell checker.
- Undo, history.
- Clipboard.
- Preview content. Hidden, time- or access restricted content can be previewed online before publishing.
- Multiple Page Editing. Any level of pages can be loaded into an editing form by specifying parameters such as name, date online/offline, etc. to be edited at the same time.
- Minimal Training Required.

3.11   Polls and surveys

- Include the TTCP survey.

3.12   Exchanges of files

- Upload/download of documents functionality (FTP/HTTP).

3.13   Standards compliance (text from TYPO3 web site)

- Syndicate to external audiences via exporting or importing RSS feeds.

- FTP Support.

- UTF-8 Support.

- WML Support.

- WAP Support.

- Plain Text Support

- Printer-friendly.

- PDF support.

- XHTML Support.

- XML Support.

- Multi-language Support.

- Administrators can create a special template on top of an existing site and run another "version" of the site through this template parallel to the current site. This is often used for printer-friendly, XML, PDF and plain text versions of the site.

- Navigation, content object or template caching; Caches can be cleared in the backend manually or pages can be set on individual schedules.

- Page content caching.

- Publish pages to physical HTML files.

4   List of proposed layouts

This chapter lists some of the layouts that were proposed to the contractor.

4.1   Front-end layout

- Simple
- Effective
- It should be possible to log to one of the ComplexityHub groups from the front-end
- Figure 2 shows the front-end layout.
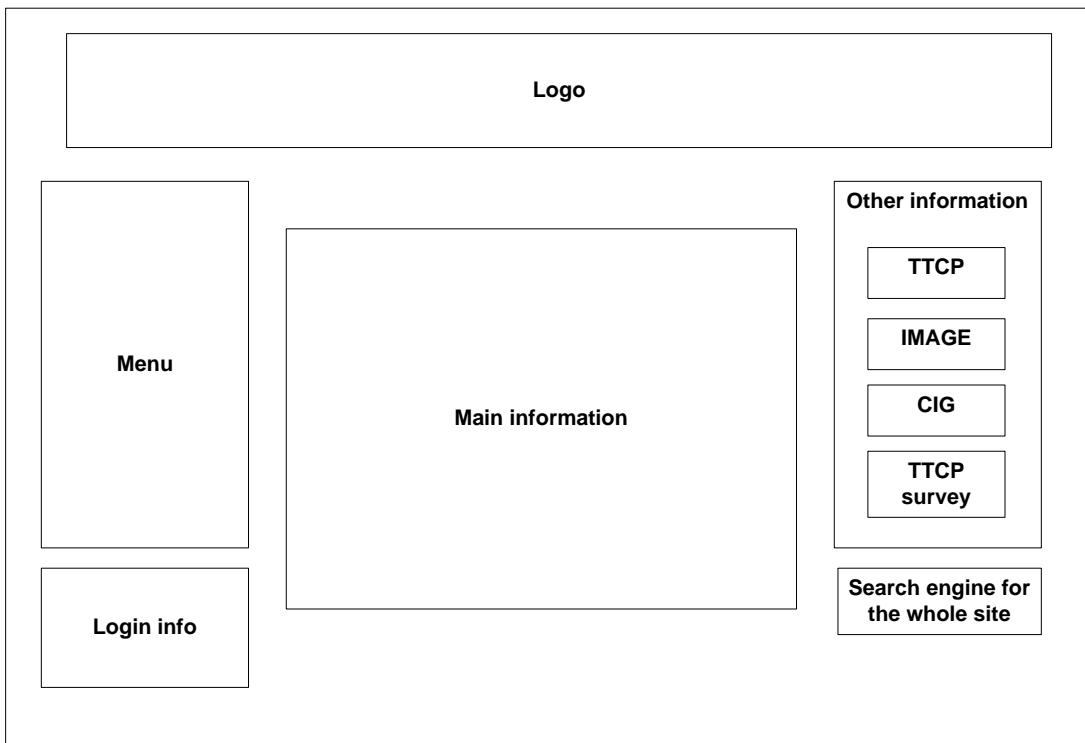
Figure 2. Front-end layout.

- Each group has its own administrator that manages web pages, content, members, security, etc. of the group.
- It is the ComplexityHub administrator's job to create groups.
- The process of creating a group will automatically generate a similar set of web pages and services as the ones included in the ComplexityHub web site.
- The front-end should show a link to TTCP survey. It's an already made form. Each submit of this form sends an email to Madame Irene Pestov (Irene.pestov@drdc-rddc.gc.ca). She will analyze the results.

4.2   Menu on the front-end

- Figure 3 shows menus that appear on the front-end.

```
Menu
┌──────────────────┐
│    Home page     │ ──Redirects──►  │   Web page   │
├──────────────────┤
│   Welcome info   │ ──Redirects──►  │   Web page   │
├──────────────────┤
│   Cx Community   │ ──Redirects──►  │   Web page   │
├──────────────────┤
│   Cx Repository  │ ──Redirects──►  │   Web page   │
├──────────────────┤
│   Cx Activities  │ ──Redirects──►  │   Web page   │
├──────────────────┤
│    Contact us    │ ──Redirects──►  │   Web page   │
└──────────────────┘

┌──────────────────┐
│      Login       │
├──────────────────┤
│  Become a member │ ──Redirects──►  │   Web page   │
└──────────────────┘
```
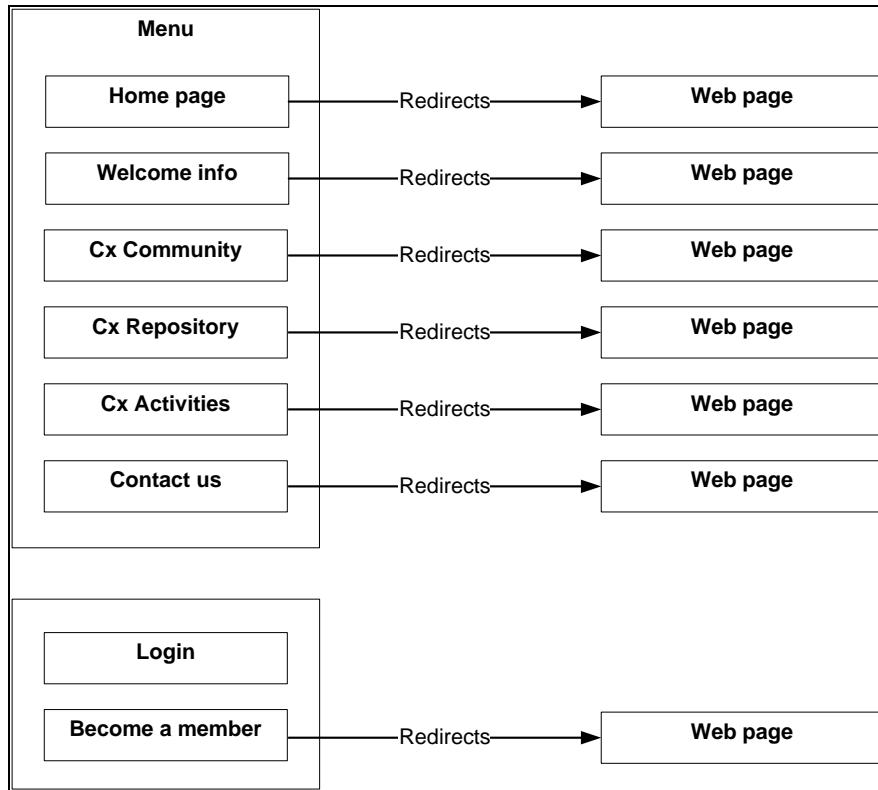
Figure 3. Front-end menus.

4.3   Welcome info page

This page is accessible to all visitors of the ComplexityHub.

Content:

- Mission of the ComplexityHub
- How to use the site
- Way to become a member of the CompelxityHub
- Offered services

Eventually:

- A way to capture visitors and members comments
- Names, emails

4.4 Cx Community page

This page is accessible to members of the ComplexityHub only.

Content:

- What is a group
- List of ComplexityHub groups (name, responsible, date, hyperlink)
- How to become a member of a group

Eventually:

- A way to capture other types of content

4.5 Cx Repository page

This page is accessible to members of the ComplexityHub only.

Content:

- List of document (name, responsible, date, type, hyperlink)
- How to become a member of a group
- Documents can be uploaded and downloaded

Eventually:

- Advanced way of grouping and manipulating documents.

4.6 Cx Activities page

This page is accessible to members of the ComplexityHub only.

Content:

- Provides information regarding activities of the community
  - Past
  - Current
  - Future

Documents can be uploaded and downloaded

4.7 Contact us page

This page is accessible to all visitors of the ComplexityHub only.

Content:

- Provides contact information

4.8   Login dialogs

- Figure 4 shows the two different login dialogs.

When not logged	When logged
	ComplexityHub
Login	**Member name**
Password	**Your account**
Become a member	**Logout**
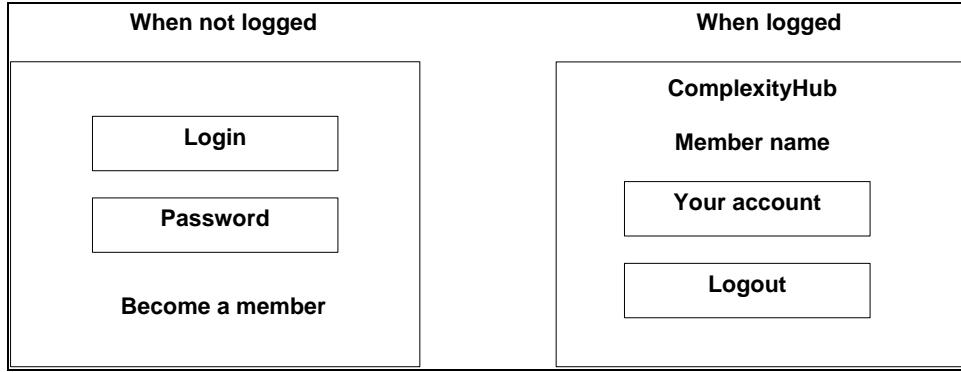
Figure 4. Login dialogs.

4.9   Other dialogs

- The conception and development of dialogs are left to the contractor.

5   Conclusion

- Figure 5 shows the front-end of the ComplexityHub web site, version 1.0.
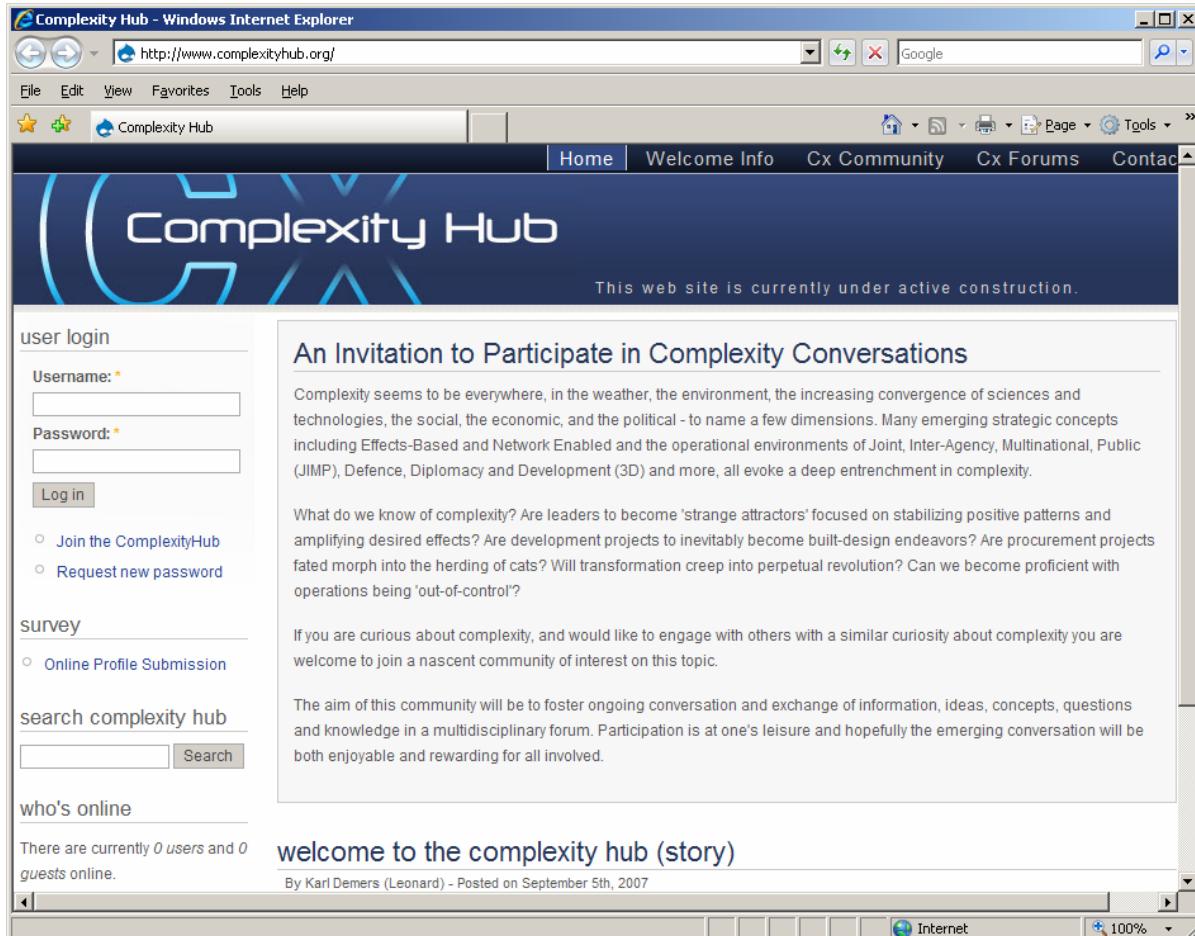
Figure 5. Front-end of the ComplexityHub web site; version 1.0.

- The web site is functional and is already used by many people and groups from all around the world (TTCP AG-14 is an example of international group).

5.1   Results of the development

- The web site has been active since the second week of September 2007

- As of the end of October 2007, three groups have been created with a total of 68 active members registered

- The ComplexityHub web site has been designated the official site for the TTCP AG-14 on complex systems involving 5 participating countries

- Many requests were received from different interest groups to expend the services offered by the web site. To respond to the demand, a second service contract was allocated for the maintenance of the web site.

- The objectives of the initial effort have been completely fulfilled.

5.2   Future works

- Further developments (next versions of the web site) should involve, among others:

  - the integration of a formal logo to the web site;

  - Improving the classification of documents within groups;

  - Improving the access of open-source information by non-,members and members (ex: proceedings from symposium on complexity);

  - Add the service of voice communication in real time;

  - Continue to implement the services proposed in this document;

  - A long term maintenance service with the assistance of a web master is required.

5.3   Recommendations

- There is an increase need for an effective, open and modern tool that will foster communication between complexity research communities.

  - The ComplexityHub web site is a viable solution.

  - During the first two months of use, many individuals and communities have showed their interest and appreciation for the tool.

  - There is an increased demand for an expansion of the initial services offered by the web site.

  - The objectives of the initial effort have been fulfilled and it is recommended to move to the second phase of the site development (see 5.2).

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Web site, ComplexityHub, complexity, theory, complex, system, research, collaboration

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